New hydrophosphates $MH_3(PO_4)_2 \cdot 0.5H_2O$ (M = Er, Y)

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Hydrogen phosphates(V) of rare earth metals are perspective as catalysts in organic synthesis, being also promising precursors in preparation of condensed phosphates of rare earth metals. However, very scant information has appeared in the literature about these salts, because there are difficulties in their synthesis.

Here we present two new hydrophosphates of rare earth metals, namely $ErH_3(PO_4)_2 \cdot 0.5H_2O$ and $YH_3(PO_4)_2 \cdot 0.5H_2O$. Thin-layer technique, developed previously [1, 2], was used for preparation of the compounds. The crystal structures of these salts were obtained from X-ray powder diffraction data at room temperature.

Both compounds are monoclinic (S.G. $P2_1/c$) and were found to be isotypic. They reveal layered crystal structure, with metal-phosphate polymeric layers and water molecules, located in interlayer space. The atoms O2, O6, and O8 of POH groups lie to the outside of the layer near the water molecules with oxygen atom O9 (see Fig.). The hydrogen atoms of POH groups form hydrogen bonds O–H···O with water molecules and also intra- and interlayer hydrogen bonds with neighboring phosphate anions.

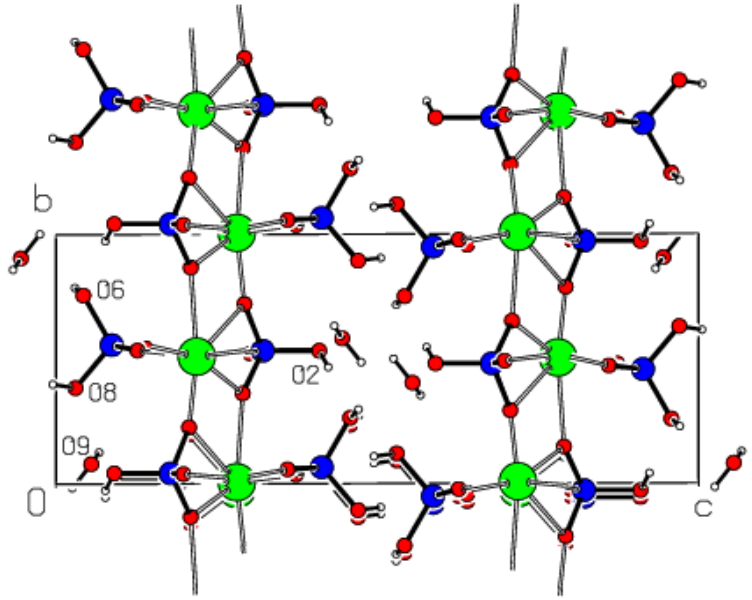

Fig. The crystal structure of $ErH_3(PO_4)_2 \cdot 0.5H_2O$ viewed along the *a* axis. The oxygen atoms of POH groups and water molecule are indicated.

References

1. A.F. Selevich, A.I. Lesnikovich Journal of Inorganic Chemistry. (1994) 9: 1386.
2. A.F. Selevich, A.S. Lyakhov, A.I. Lesnikovich. Phosphorus Res. Bull. (1999) 10: 171.